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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/031,331	01/18/2002	Akiyo Yamada	31512-176817	5969

26694 7590 10/21/2005

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EXAMINER	
IBRAHIM, MEDINA AHMED	
ART UNIT	PAPER NUMBER
1638	

DATE MAILED: 10/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/031,331	YAMADA ET AL.	
	Examiner	Art Unit	
	Medina A. Ibrahim	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *64-66,114-117,121,122 and 125* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *64 and 65* is/are allowed.

6)☒ Claim(s) *66, 114-117, 121-122 and 125* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 1/18/02 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Receipt is acknowledged of Applicants' response filed 09/27/05 in reply to the Advisory action of 07/28/05. However, upon further search and consideration, it has been determined that the finality of the rejection of the last Office action be withdrawn. This Office action contains NEW GROUNDS OF REJECTION and is made non-final. The delay in applying these new grounds of rejection is regretted.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

All previous objections and rejections not set forth below have been withdrawn upon further consideration.

Claims 64-66, 114-117, 121-122, and 125 are pending and are examined.

Drawings

The drawings are objected to because the brief description accompanying Figure 6 contains a non-English term. See Figure 6. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the

several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

At claim 125, it is suggested that "derived" be replaced with ---obtained---, for clarification.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 66, 114-117, 121-122 and 125 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for an isolated DNA encoding SEQ ID NO: 40, a vector comprising said DNA, an isolated host cell transformed with said vector, a method for transforming host cell with said vector, and plants/plant cells transformed with said vector, does not reasonably provide enablement for an isolated DNA which hybridizes to SEQ ID NO: 39 or its complementary sequence under the conditions as recited in claim 66. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to

make and/or use the invention commensurate in scope with these claims. This rejection is repeated for the reasons of record as set forth in the last Office actions of 09/16/04 and 03/28/05. Applicant's arguments filed 09/27/05 have been fully considered but are not deemed persuasive.

The claims are broadly drawn to an isolated DNA which hybridizes with SEQ ID NO: 39 or its complementary sequence under conditions for hybridization at 42 and washing treatment with a buffer containing 1XSSC% SDS at 42°C, wherein the hybridizing DNA encodes a protein having the activity of improving tolerance at least against salt stress.

Applicant argues that DNA sequences that hybridize to SEQ ID NO: 39 or its complementary under stringent conditions and encoding a protein having salt stress tolerance activity can be obtained by using the methods of Examples 1-6 disclosed in the instant specification (response, pp. 33-34).

This is not persuasive because the scope of the claims encompasses a large number of DNA sequences that are unrelated to SEQ ID NO: 39. The hybridization conditions as set forth in claim 66 define low stringency, therefore, the majority of DNA sequences obtainable under such conditions are not expected to encode functional proteins that are functionally related to SEQ ID NO: 40. In addition, while the specification discloses methods for isolating DNA sequences from various halophyte species, none of the disclosed DNA was isolated using the hybridization conditions as recited in claim 66. Applicant has provided no convincing evidence to support the conclusion that all DNA sequences that hybridize to SEQ ID NO: 39 under the

conditions as set forth in the claims would encode functional proteins which will induce salt tolerance activity upon expression in a transgenic plant.

Also, DNA sequences that hybridize to SEQ ID NO: 39 include DNA sequences with multiple of nucleotide modifications relative to SEQ ID NO: 39 encoding proteins with multiple of amino acid modifications relative to SEQ ID NO: 40. However, the instant specification does not provide guidance for any modifications to SEQ ID NO: 39 or 40 that retain phosphoethanolamine N-methyltransferase activity. Therefore, one skilled who is willing to practice the claimed invention would have to make all possible nucleotide/amino acid modifications in the 1602 base pair nucleotide sequence of SEQ ID NO: 39 or the 473 amino acid sequence long of SEQ ID NO: 40 and test all nucleotide sequences that meets the structural limitations to determine which also meet the functional limitation. For example, making all single amino acid substitutions in an 473 amino acid long protein like that encoded by SEQ ID NO: 39 would require making and analyzing 19^{473} DNA sequences; these proteins would have 99.8% identity to SEQ ID NO: 40. Because DNA sequences that hybridize to SEQ ID NO: 39 under the conditions as set forth in claim 66 would encode proteins with multiple amino acid modifications, one would need to make and test 19^{473} DNA sequences. One would also have test the ability of each of said DNA sequences to induce salt tolerance in transgenic plants. These tests are considered undue.

The state of the prior art teaches unpredictability inherent in DNA/protein function if one or more amino acids/bases in that DNA/protein are modified. For example, Lazar et al (Molecular and Cellular Biology, March 1988, Vol. 8, No. 3, pp. 1247-1257) teach

that a mutation of aspartic acid 47 and leucine 48 of a transforming growth factor alpha results in different biological activities (see at least the Title). Broun et al (Science, 13 November 1998, vol. 282, pp. 1315-1317) teach that as few as four amino acid substitutions in a protein can change the protein activity (Abstract). Note, the nucleotide sequences encoding the proteins (mutated and original) disclosed by either Lazar or Broun would hybridize to each other under the stringent conditions as set forth in claim 66. Therefore, it is highly unpredictable that the majority of DNA sequences that hybridize to SEQ ID NO: 39 under stringent conditions recited in claim 66 would encode a protein having the activity of improving tolerance at least against salt stress.

Genentech Inc. v. Novo Nordisk A/S, 108 F.3d 1361, 1366, 42 USPQ2d 1001, 1005 (Fed. Cir. 1997) states. .... It is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement". The *Genentech* court also held that [w]hile every aspect of a generic claim certainly need not have been carried out by an inventor, or exemplified in the specification, reasonable detail must be provided in order to enable members of the public to understand and carry out the invention". Id. In this case, as in *Genentech*, the specification does not provide the "reasonable detail .....to enable members of the public to understand and carry out the invention as broadly claimed". See also, *Amgen Inc. Chugai Pharmaceutical Co. Ltd.*, 18 USPQ 2d 1016 at 1027 (Fed. Cir. 1991) where the court held that the disclosure of a few gene sequences did not enable claims broadly drawn to any analog thereof, and *In re Fisher*, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970) which states " the scope of enablement must bear a "reasonable

correlation" to the scope of the claims. In the instant case, the scope of the claims does not reasonably correlate to the scope of enablement.

Furthermore, it is noted that the complementary sequence of SEQ ID NO: 39 of claim 65 is the antisense strand and is not expected to encode a protein or induce salt tolerance as claimed in claim 117. Similarly, plants and plant cells transformed with the complementary sequence of SEQ ID NO: 39 are not expected to exhibit stress tolerance.

Therefore, given the breadth of the claims; the lack of guidance as discussed supra and in the last Office actions; the unpredictability with regard to amino acid modifications; and the limited working examples, the claimed invention is not enabled throughout the broad scope (*In re Wands 858F.2d 731, 8 USPQ2d 1400 (Fed. Cir. 1988).*

Written Description

Claims 66, 114-117, 121-122 and 125 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This rejection is repeated for the reasons of record as set forth in the last Office actions of 09/16/04 and 03/28/05. Applicant's arguments filed 09/27/05 have been fully considered but are not deemed persuasive.

Applicant argues that the instant specification provides description of how to identify sequences for inducing salt tolerance and that methods of obtaining sequences that hybridize to SEQ ID NO: 39 under stringent conditions are known in the art (response, p. 4).

These are not persuasive because the specification does not describe a representative number of DNA sequences of the genus claimed. The hybridization conditions as recited in the claim 66 define low stringency and are not expected to result in sequences that are structurally and/or functionally related SEQ ID NO: 39. Given the vast number of DNA sequences encompassed by the claimed genus and the expected variation in structures and function within members of said genus, the description of SEQ ID NO: 39 is insufficient to provide adequate written description for the claimed genus encompassing all DNA sequences that hybridize to SEQ ID NO: 39 under the conditions as set forth in the claims. In addition, while the specification describes methods for isolating DNA sequences from various halophyte species, such description would not provide any information regarding the written description of DNA sequences that hybridize to SEQ ID NO: 39. In addition, none of the disclosed DNA was isolated using the hybridization conditions as recited in claim 66.

In *Eli Lilly and Co.* 43 USPQ2d 1398 (Fed. Cir. 1997), the court stated:

An adequate written description of a DNA "requires a precise definition, such as by structure, formula, chemical name, or physical properties", not a mere wish or plan for obtaining the claimed chemical invention... Accordingly, "an adequate written description of a DNA requires more than a mere statement that it is part of the invention and reference to a potential method of isolating it; what is required is a description of the DNA itself (43 USPQ2d at 1404).

The court held that held that human insulin-encoding cDNA is not described by prophetic example, which sets forth only a general method for obtaining the human cDNA:

The name cDNA is not itself a written description of that DNA; it conveys no distinguishing information concerning its identity...Describing a method of preparing a cDNA or even describing the protein that the cDNA encodes...does not necessarily describe the DNA itself. No sequence information indicating which nucleotides constitute human cDNA appears in the patent, as appears for rat cDNA....Accordingly, the specification does not provide a written description of human cDNA (43 USPQ2d at 1405).

The description of a single species of rat cDNA was held insufficient to describe the broad genera of vertebrate or mammalian insulin:

"In claims to genetic material...a generic statement such as 'vertebrate insulin cDNA' or 'mammalian insulin cDNA', without more, is not an adequate written description of the genus because it does not distinguish the claimed genus from others, except by function. It does not specifically define any of the genes that fall within its definition. It doesn't define any structural features commonly possessed by members of the genus that distinguish them from others. One skilled in the art therefore cannot, as one can do with a fully described genus, visualize or recognize the identity of the members of the genus. A definition by function...does not suffice to define the genus because it is only an indication of what the gene does, rather than what it is (43 USPQ2d at 1406).

The court continued:

"Thus...a cDNA is not defined by the mere name 'cDNA', even if accompanied by the name of the protein that it encodes, but requires a kind of specificity usually achieved by means of the recitation of the sequence of nucleotides that make up the cDNA...A description of a genus of cDNAs may be achieved by means of a recitation of a representative number of cDNAs, defined by nucleotide sequence, falling within the scope of the genus or of a recitation of structural features common to members of the genus, which features constitute a substantial portion of the genus". (43 USPQ2d at 1406). See also where the court teaches that the disclosure of a process for obtaining cDNA from a particular organism and the description of the encoded protein fail to provide an adequate written description of the actual cDNA from the organism which would encode the protein from that organism, despite the disclosure of a cDNA encoding that protein from another organism.

Therefore, for all the reasons discussed above, the claimed invention is not adequately described. See also MPEP 2163.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 66, 114-117, 121-122 and 125 are rejected under 35 U.S.C. 102(b) as being anticipated by Sheveleva et al (Plant Physiology (1997), vol. 115, pp. 1211-1219; Applicant's IDS).

Sheveleva et al teach an isolated DNA from *Mesembryanthemum crystallinum* encoding a protein that confers salt and water stress tolerance and a method for transforming tobacco plant cells with said DNA under the control of the CaMV 35S in a plant transformation construct (see Methods and Materials, page 1212). Transformed tobacco cells were regenerated and grown to maturity. T4 progeny plants were tested for salt and water stress tolerance (see pages 1212-1213, Results). Since the prior art DNA is also from a halophyte and since the hybridization conditions of claim 66 define low stringency and do not specify hybridization/wash time (duration), the prior art DNA will hybridize to Applicant's SEQ ID NO: 39, absent evidence to the contrary. Therefore, Sheveleva et al teach all claim limitations.

Remarks

Claims 64 and 65 are allowed.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Medina A. Ibrahim whose telephone number is (571) 272-0797. The Examiner can normally be reached Monday -Thursday from 8:00AM to 5:30PM and every other Friday from 9:00AM to 5:00 PM. Before and after final responses should be directed to fax nos. (703) 872-9306 and (703) 872-9307, respectively.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Dr. Amy Nelson, can be reached at (571) 272-0804.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

10/13/05
Mai

Medina A. Ibrahim

MEDINA A. IBRAHIM
PATENT EXAMINER